2000

Prairie Analysis at Prairie Ridge State Natural Area, Jasper County, IL

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PRAIRIE ANALYSIS AT PRAIRIE RIDGE STATE NATURAL AREA,

JASPER COUNTY, IL

(TITLE)

BY

ANNETTE KESSLER

THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF

Master of Science

IN THE GRADUATE SCHOOL, EASTERN ILLINOIS UNIVERSITY
CHARLESTON, ILLINOIS

2000

YEAR

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PRAIRIE ANALYSIS AT PRAIRIE RIDGE STATE NATURAL AREA, JASPER COUNTY, IL

BY:

ANNETTE KESSLER

Abstract:

Five restored prairie sites at Prairie Ridge State Natural Area in Jasper County were studied during the growing season of 1998. These sites varied in age from two years to thirty years and in size from 4 acres to 10 acres. Key areas of data recorded were an overall and site specific vascular species lists, phenology of various species, and cover analysis of each site. Frequency cover and importance values of the taxa were determined using randomly located quadrats along line transects. Prairie quality of each site was determined, as well as a similarity index that compared the sites to each other.

Prairie Ridge State Natural Area is approximately 2,500 acres. About half of this land is under the ownership of The Nature Conservancy, and about 200 acres is owned by AmerenCIPS, a power company. The Illinois Department of Natural Resources (IDNR) owns the rest and manages the entire 2,500 acres. Approximately 567 acres are dedicated as nature preserves. Although the area was originally established for the greater prairie chicken, Prairie Ridge State Natural Area now consists of several diverse habitats, including wetland, native grasslands, and introduced grasslands. Currently, 35 species of special concern have been documented at PRSNA. Of these, 30 are birds, 2 are reptiles, and 3 are plants.

The study area included five separate restored prairie sites scattered throughout the PRSNA in Jasper County. All of these sites were previously agricultural land, with the main crops being corn, soybeans, and wheat. These areas were reconditioned and were seeded with native grasses. They have been maintained by occasional burns, mowing, and

grazing. Soils in this area are composed of Illinoian glacial till overlain with loess deposits. This grayish brown soil has a high clay content with poor drainage.

Prairie quality was determined and compared with age of the restored prairie. No direct correlation between age and quality was found. This is probably due to variations in establishment and management of the prairie sites. The best quality site was the second oldest site. This site had more management techniques done to it, a more diverse beginning seed source, and is situated in the middle of other natural sites. This study also included a restored prairie site that was one year old. This site had a diverse seed source, but did not show a lot of diversity the first year. Some of these species may need a couple of years to establish themselves. This study involved prairie restoration sites with various management techniques.

Dedications and Acknowledgements:

I would like to express a special thanks to Dr. Gordon Tucker and Dr. John Ebinger for all of their knowledge, assistance, and above all else their patience.

Also, thanks to Scott Simpson and Terry Esker for allowing me to use their site in Jasper County to study and for assisting me in my studies.

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PART 1: Introduction

Five restored prairie sites at Prairie Ridge State Natural Area in Jasper County were studied during the growing season of 1998. These sites varied in age from two years to thirty years and in size from approximately 1.6 hectares to 4 hectares.

Prairie Ridge State Natural Area (PRSNA), located in east-central Illinois, began as a conservation project in the early 1960's with the primary goal to rescue the declining population of the greater prairie-chicken (*Tympanuchus cupido*). Habitat loss was the main factor for this decline. According to Government Land Office survey notes from the early 1800's, 87% of the current PRSNA land was dominated by prairies, with the remaining as forest. Following European settlement of the area, the prairie areas were cultivated. As agricultural practices became more intense, the Greater Prairie-Chicken population declined (Simpson, 1998).

The first land purchased through this conservation project was in Jasper County in 1962. This land, as well as the majority of land purchased, was currently being farmed for soybeans, corn, and/or wheat. It generally took two to three years to recondition the land so that it was suitable for the prairie chickens. The land acquired in the conservation areas was also scattered because of limited funds, availability of land, and current nesting grounds of the prairie chickens (Sanderson 1973).

Today, Prairie Ridge State Natural Area is approximately 2,500 acres in size. About half of this land is under the ownership of The Nature Conservancy, and about 200 acres is owned by AmerenCIPS, a power company. The Illinois Department of Natural Resources (IDNR) owns the rest and manages the entire 2,500 acres. Approximately 567 acres are dedicated as nature preserves. Although the area was originally established for the greater prairie chicken, Prairie Ridge State Natural Area now consists of several diverse habitats, including wetland, native grasslands, and introduced grasslands (Prairie Ridge State Natural Area, 1998). Currently, 36 species of special concern have been documented at

PRSNA. Of these, 17 are state-endangered, eight state-threatened, six watchlist, and five additional area sensitive species. (Simpson, 1998).

PART 2: Materials and Methods

Weekly visits were made to each of the five study sites to record presence of species, abundance of species, and phenology data. Occurrence of species was determined by visual observations. Voucher specimens for species observed were collected and deposited at the Stover-Ebinger herbarium at Eastern Illinois University, Charleston, Illinois (EIU). Abundance of species was determined by using a scale of "1-5", with "1" being rare, "2" occasional, "3" common, "4" abundant, and "5" very abundant. Initial, peak, and final flowering dates were noted for most of the species.

The week of August 31 to September 5 coverage data was taken for the five sites. A 50 meter long transect was randomly located in each of the five sites. Along each transect, $1/4m^2$ quadrats were randomly located at one meter intervals. Quadrats located at odd numbered intervals were located on the right side of the transect line and even numbered intervals were located on the left side of the transect line. A random numbers table (single digit) was used to determine meters from the transect line. Coverage data for each species was recorded using the Daubenmire cover class system (Daubenmire 1959) as modified by Bailey and Poulton (1968). The modified Daubenmire cover scale has the following values: class 1 = 0-1%; class 2 = 1-5%; class 3 = 5-25%; class 4 = 25-50%; class 5 = 50-75%; class 6 = 75-95%; class 7 = 95-100%.

Coverage data and species lists were used to calculate importance values of the major species, floristic quality index of each site, physiognomy data, and wetness classifications. Importance values were determined by summing the relative cover and the relative frequency for each species. The Florist Quality Index (FQI) was determined for

each site by utilizing the coefficient of conservatism (CC) assigned to each species by Taft, et al. (1997). As used here, the FQI is a weighted index of species richness (N), and is the arithmetic product of the average coefficient of conservatism (CC), multiplied by the squareroot of the species richness (N) of an inventory site [FQI = CC(N)]. Physiognomy data and wetness classifications were determined based on values assigned for each species by Taft, et al. (1997).

The Sorensen's Index of Similarity (ISs) (Mueller-Dombois and Ellenber 1979) was used to establish some degree of vegetative similarity between the sites. The Sorensen's Index of Similarity is 2 times the number of species similar between the two sites (C) divided by the sum of the total number of species found at each site (A = # species at first site; B = # species at second site) and then converted to a percentage. [ISs = 2C/(A+B) X 100].

PART 3: Description of Study Areas

The study area included five separate restored prairie sites scattered throughout the PRSNA in Jasper County. All of these sites previously were agricultural land, with the main crops being corn, soybeans, and wheat. These areas were reconditioned and were seeded with native grasses. They have been maintained by occasional burns, mowing, and grazing. In general, the soils in this area are composed of Illinoian glacial till overlain with loess deposits (Willman et al. 1975). This grayish brown soil has a high clay content with poor drainage (Barmstedt 1992). Specifics for each of the five study sites follow.

Galbreath Sanctuary - Field B ***7 years old***

Galbreath Sanctuary is approximately 2.4 hectares and was seeded in May 1991. The seed mix was an Illinois Ecotype of a Little Blue mix from Walnut, IL in Lee County.

Two pounds of mixed forb seed was added. This portion of Galbreath Sanctuary was burned in 1993, 1994, and 1997. It was mowed in 1991 and 1995, and was cut for seed in 1997.

The soil at Galbreath Sanctuary is classified as Hoyleton silt loam , 1-3 percent slopes. This type of soil is classified as very gently sloping, somewhat poorly drained soil. The surface layer is very dark grayish brown, friable silt loam about eight inches thick. The subsurface layer is brown, friable silt loam about seven inches thick. The subsoil is mottled and firm and extends to a depth of more than 60 inches. The upper part is brown and yellowish brown silty clay loam. The lower part is yellowish brown silt loam. Water and air movement through Hoyleton silt loam is slow. Available water capacity is high and the organic matter content is moderately low (Barmstedt 1992).

Lew's Prairie ***c. 30 years old***

Lew's Prairie is approximately 2 hectares and was restored in the early 1970's. No information could be found on what type of seed source was used. The only burn date recorded was 1995. This site was mowed in 1983, 1986, 1987, 1992, and 1993, and was hayed in 1985.

The soil type at Lew's Prairie is classified as Hoyleton silt loam, 1-3 percent slopes. This type of soil is described in Galbreath Sanctuary's site description (Barmstedt 1992).

Fuson Farm - Field J ***c. 25 years old***

Fuson Farm is approximately 2.4 hectares. This area was seeded in the early 1970's. No information could be found on what type of seed source was used. This site was burned in 1992, and the west half was burned in 1997. Fuson Farm was mowed at the beginning of August, 1998, therefore the information gathered for this site is limited.

The soil at Fuson farm is classified as a "Cisne silt loam". This type of soil is characterized as level and poorly drained. The surface layer is very dark grayish brown,

friable silt loam about eight inches thick. The subsurface layer is friable silt loam about nine inches thick. The upper part is grayish brown and mottled, and the lower part is light gray and light brownish gray. The subsoil is silty clay loam and is about 43 inches deep. The upper part is gray and light gray and is friable. The next part is grayish brown and firm, and the lower part is light brownish gray and firm. The underlying material to a depth of 70 inches or more is dark grayish brown, mottled, firm silt loam. Cisne soil has slow surface runoff, and water and air movement through the soil is very slow. Capacity for available water is high. Organic matter content is low (Barmstedt 1992).

McGraw Sanctuary - SW Corner ***9 years old***

McGraw Sanctuary is approximately 1.6 hectares and was seeded in May of 1988. Non-native grass seed was cut from a surrounding site and likely contained Ramsey Indian, Kaw Big Bluestem. No forbs were added. This site was cut for seed in 1989, burned in 1990, 1992, 1992, and 1995, and hayed in 1996.

The soil at McGraw Sanctuary is classified as Cisne silt loam. This type of soil is described in Fuson Farm's site description (Barmstedt 1992).

Frohning Farm ***1 year old***

Frohning Farm is approximately 4.0 hectares and was seeded May 19, 1997. The seed mix was a Missouri Ecotype Grass plus forbs. This site had not been burned.

The soil at Frohning Farm is classified as Hoyleton silt loam, 1-3 percent slopes. This type of soil is described in Galbreath Sanctuary's site description (Barmstedt 1992).

PART 4: Results

Galbreath Sanctuary

A total of 81 species was found on Galbreath Sanctuary. Of these, 67 were native and 14 were adventive. There were 12 annual forb species, 5 biennial forb species, 40 perennial forb species, 2 annual grass species, 10 perennial grass species, 1 annual sedge species, 6 perennial sedge species, 1 woody vine species, 2 shrub species and 2 tree species.

Of the 81 species, 4 were obligate wetland species, 13 were facultative wetland species, 22 facultative species, 25 facultative upland species, and 16 upland species. Three problem exotics were identified. This classification of species was determined by data from Taft et. al (1997).

The total floristic quality index (FQI) at Galbreath Sanctuary was 25.40. The FQI for just the native species was 27.75. The mean conservatism (C) was 2.84. For native species only, the mean conservatism was 3.39. The mean wetness was 1.32. For native species only, the mean wetness was 1.30.

There were 33 species identified at Galbreath Sanctuary during the cover analysis. Of these, there were six species with importance values (IV) greater than 10. They were *Solidago nemoralis* (33.42), *Andropogon gerardii* (31.27), *Sorgastrum nutans* (22.68), *Euthamia graminifolia* (17.85), *Carex sp.* (11.86), and *Eleocharis sp.* (10.18).

There were 8 species with importance values between 4.00 and 9.99. They were *Vernonia missourica* (7.42), *Euphorbia corollata* (7.07), *Dichanthelium acuminatum* (5.90), *Hypericum perforatum* (5.90), *Rubus flagellaris* (5.38), *Achillea millefolium* (4.26), *Potentilla simplex* (4.26), and *Malus ioensis* (4.23).

There were 9 species with importance values between 1.00 and 3.99. They were *Oxalis dillenii* (2.98), *Acalypha virginica* (2.95), *Rosa carolina* (2.89), *Cyperus ovularis* (2.55), *Lonicera joponica* (2.52), *Panicum virgatum* (2.52), *Baptisia lactea* (2.38), and *Schizachyrium scoparium* (2.38).

Eleven species had importance values less than 1.00. They were *Viola pratincola* (0.85), *Oenothera biennis* (0.82), *Solidago canadensis* (0.82), *Lespedeza intermedia* (0.43), *Paspalum laeve* (0.43), *Rumex acetocella* (0.43), *Sassafras albidum* (0.43), *Setaria faberi* (0.43), *Crotonopsis elliptica* (0.42), and *Pycnanthemum tenuifolium* (0.42).

Lew's Prairie

A total of 62 species was found at Lew's Prairie. Of these, 50 were native species and 12 were adventive species. There were 7 annual forb species, 4 biennial forb species, 34 perennial forb species, 2 annual grass species, 7 perennial grass species, 4 perennial sedge species, 1 woody vine species, and 3 shrub species.

Of the 62 species, 5 were obligate wetland species, 8 were facultative wetland species, 20 were facultative species, 15 were facultative upland species, and 14 were upland species. Three problem exotics were identified.

The total floristic quality index (FQI) at Lew's Prairie was 21.57. The FQI for native species only was 24.04. The mean conservatism (C) was 2.74. For native species only, the mean conservatism was 3.40. The mean wetness was 1.18. For native species only, the mean wetness was 0.94.

There were 21 species identified at Lew's Prairie during the cover analysis. Of these, there were 9 species with importance values (IV) greater than 10.00. They were *Solidago canadensis* (43.19), *Rubus flagellaris* (23.60), *Euthamia graminifolia* (22.00), *Sorghastrum nutans* (20.50), *Pycnanthemum tenuifolium* (17.29), *Vernonia missurica* (15.15), *Solidago nemoralis* (14.35), *Andropogon gerardii* (11.84), and *Cassia fasciculata* (10.67).

There was one species with importance value between 4.00 and 9.99. It was *Achillea millefolium* (5.30).

Eight species had importance values between 1.00 and 3.99. They were *Desmodium paniculatum* (3.80), *Lespedeza intermedia* (2.15), *Prunella vulgaris* (2.15), *Eleocharis sp.* (1.59), *Potentilla simplex* (1.59), *Liatris pycnostachya* (1.09). *Cirsium discolor* (1.09), and *Ambrosia bidenta* (1.06).

There were 3 species with importance values of less than 1.00. They were *Dichanthelium acuminatum* (0.53), *Euphorbia corrolata* (0.53), and *Lonicera japonica* (0.53).

McGraw Sanctuary

A total of 41 species was found at McGraw Sanctuary. Of these, 35 were native and 6 were adventive. There were 5 annual forb species, 2 biennial forb species, 17 perennial forb species, 3 annual grass species, 4 perennial grass species, 8 perennial sedge species, 1 woody vine species, and 1 shrub species.

Of the 41 species, 3 were obligate wetland species, 10 were facultative wetland species, 11 were facultative species, 13 were facultative upland species, and 4 were upland species. Two problem exotics were identified.

The total floristic quality index (FQI) at McGraw Sanctuary was 17.55. The FQI for native species only was 19.01. The mean conservatism (C) was 2.78. For native species only, the mean conservatism was 3.26. The mean wetness was 0.43. For native species only, the mean wetness was 0.29.

There were 20 species identified at McGraw Sanctuary during the cover analysis. Of these, 7 had importance values (IV) greater than 10. They were *Andropogon gerardii* (48.65), *Sorghastrum nutans* (38.71), *Solidago nemoralis* (16.67), *Schizachyrium scoparium* (16.49), *Solidago canadensis* (12.74), *Carex sp.* (11.14), and *Panicum virgatum* (11.11).

There were 4 species with importance values between 4.00 and 9.99. These were *Eleocharis sp.* (9.58), *Cyperus strigosus* (9.46), *Euthamia graminifolia* (4.76), and *Verbena hastata* (4.76).

Four species had importance values between 1.00 and 3.99. These were *Scirpus georgianus* (3.99), *Cassia fasciculata* (3.19), *Rubus flagellarus* (3.16), and *Erigeron yuccifolium* (1.59).

Five species had importance values less than 1.00. These were *Acalypha virginica* (0.80), *Barbarea vulgaris* (0.80), *Hypericum mutilum* (0.80), *Hypericum perforatum* (0.80), and *Vernonia missurica* (0.80).

Frohning Farm

A total of 29 species was found at Frohning Farm. Of these, 26 were native and 3 were adventive. There were 6 annual forb species, 18 perennial forb species, 2 annual grass species, 2 perennial grass species, and 1 perennial sedge species.

Of the 29 species, 4 were obligate wetland species, 6 were facultative wetland species, 7 were facultative species, 8 were facultative upland species and 4 were upland species.

The total floristic quality index (FQI) at Frohning Farm was 13.57. The FQI for native species only was 14.33. The mean conservatism (C) was 2.52. For native species only, the mean conservatism was 2.81. The mean wetness was 0.240. The mean wetness for native species only was also 0.240.

There were 5 species identified at Frohning Farm during the cover analysis. Of these, 3 had importance values (IV) greater than 10. They were *Sorghastrum nutans* (94.89), *Andropogon gerardii* (80.45), and *Setaria faberi* (11.03).

Two species had importance values between 4.00 and 9.99. They were *Solidago canadensis* (7.83), and *Asclepias syriaca* (5.80).

Fuson Farms

A total of 29 species was found at Fuson Farms. Of these, 20 were native and 9 were adventive. There were 2 annual forb species, 1 biennial forb species, 14 perennial forb species, 5 perennial grass species, 5 perennial sedge species, and 2 shrub species.

Of the 29 species, 4 were obligate wetland species, 5 were facultative wetland species, 7 were facultative species, 8 were facultative upland species, and 5 were upland species. Two problem exotic were identified.

The total floristic quality index (FQI) at Fuson Farms was 9.85. The FQI for native species only was 11.85. The mean conservatism was 1.83. For native species only, the mean conservatism was 2.65. The mean wetness was 0.793. For native species only, the mean wetness was -0.25.

Since Fuson Farm was mowed before the end of August, no cover analysis was performed and no importance values were calculated.

Summary of Sites

Overall, the five sites were fairly similar. Galbreath Sanctuary, Lew's Prairie, and McGraw Sanctuary were the most similar. These sites had the highest floristic quality indexes (25.20, 21.57, and 18.12 respectively). Galbreath Sanctuary and Lew's Prairie had a similarity index of 52.8. Galbreath Sanctuary and McGraw Sanctuary had a similarity index of 58.3, and McGraw Sanctuary and Lew's Prairie had a similarity index of 57.1. Frohning Farm and Fuson Farm had significantly lower floristic quality indexes (13.57 and 9.85 respectively). They also had a lower similarity index as compared to the other sites. Frohning Farm and Galbreath Sanctuary had a similarity index of 35.2, Frohning Farm and Lew's Prairie had a similarity index of 37.4, and Frohning Farm and McGraw Sanctuary had a similarity index of 36.4. Fuson Farm and Galbreath Sanctuary had a similarity index of 33.0, Fuson Farm and Lew's Prairie had a similarity index of

31.6, Fuson Farm and McGraw Sanctuary had a similarity index of 38.9, and Fuson Farm and Frohning Farm had a similarity index of 30.0.

Many species with high importance values were found on three or more of the four main sites (Galbreath Sanctuary, Lew's Prairie, McGraw Sanctuary, and Frohning Farm). The top 3 of these species, which were found on all four of the main sites, were *Sorghastrum nutans*, *Andropogon gerardii*, and *Solidago canadensis*. Species found on 3 of the 4 sites were *Solidago nemoralis*, *Euthamia graminifolia*, *Rubus flagellarus*, *Vernonia missurica*, and *Eleocharis sp.*

PART 5: Discussion

There was no direct correlation between age of the restored site and quality of the site. Only the four main sites (Galbreath Sanctuary, Lew's Prairie, McGraw Sanctuary, and Frohning Farm) will be compared since Fuson Farm was mowed and incomplete data was collected. Many variables existed between the sites, such as seed source, number of burns, and other maintenance practices. Lew's Prairie, the oldest of the sites, ranked second to Galbreath Sanctuary, the third oldest of the sites. Lew's Prairie had a FQI of 21.57, compared to an FQI of 25.20 for Galbreath Sanctuary. This may be due to the fact that Galbreath had a more diverse seed source, more burns, and less of a chance to be invaded by problem species. Galbreath Sanctuary is also situated between natural areas, while as most of the other areas are surrounded by agricultural land. This may allow the available seed source to be of a higher quality and exclude some of the non-native and invansive species. McGraw Sanctuary, the second oldest of the sites, placed a distant third for FQI with a value of 18.12. McGraw Sanctuary was seeded mainly with grass seed and no forbs were added. This resulted in a lower diversity and therefore a lower FQI. Frohning Farm ranked third, with an FQI of 13.57. This is a new restoration site

and may require several years in addition to management techniques to raise the quality of this site.

Prairie restoration is a complex procedure in which the ultimate results may not be seen for several years. It is necessary to continuously practice management techniques to maintain quality of restored prairie sites. Based on the results of this study, Galbreath proved to be the best quality of restored prairie at Prairie Ridge State Natural Area. Techniques applied in this area should serve as a starting point for future restoration projects.

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Tables and Graphs

Table 1. Floristic integrity assessment summary data comparing various prairie sites at Prairie Ridge State Natural Area, Jasper County, Illinois

Parameter	Galbreath	Lew's	McGraw	Frohning	Fuson*
Restoration Age (Years)	7	30	9	1	25
Size (Hectares)	2.4	2.0	1.6	4.0	2.4
Total Species Richness	81	62	41	29	29
Native Species Richness	67	50	35	26	20
% Adventive	17.28	19.40	14.63	10.34	31.0
Floristic Quality Index (FQI)	25.20	21.57	18.12	13.57	9.85
FQI (natives only)	27.75	24.04	19.58	14.33	11.85
Mean Conservatism (C)	2.80	2.74	2.83	2.52	1.83
Mean C (natives only)	3.39	3.40	3.31	2.81	2.65
Mean Wetness	1.35	1.18	0.51	0.24	0.793
Mean Wetness (natives only)	1.30	0.94	0.29	0.24	-0.25

*Fuson site was mowed, 8/1/98

Table 2. Similarity index of various prairie sites at Prairie Ridge State Natural Area, Jasper County, Illinois

	Galbreath	Lew's	McGraw	Frohning	Fuson
Galbreath					
Lew's	52.8				
McGraw	58.3	57.1			
Frohning	35.2	37.4	36.4		
Fuson	33.0	31.6	38.9	30.0	

Table 3. Summary of species by site at various prairies at Prairie Ridge State Natural Area, Jasper County, Illinois

	Galbreath	Lew's	McGraw	Frohning	Fuson
TOTAL Species	81	62	41	29	29
Native Species	67	50	35	26	20
Adventive Species	14	12	6	3	9
Annual Forb	12	7	5	6	2
Biennial Forb	5	4	2	0	1
Perennial Forb	40	34	17	18	14
Annual Grass	2	2	3	2	0
Perennial Grass	10	7	4	2	5
Annual Sedge	1	0	0	0	0
Perennial Sedge	6	4	8	1	5
Herbaceous Vine	0	0	0	0	0
Woody Vine	1	1	1	0	0
Shrub	2	3	1	0	2
Tree	2	0	0	0	0
Obligate Wetland	4	5	3	4	4
Facultative Wetland	13	8	10	6	5
Facultative	22	20	11	7	7
Facultative Upland	25	15	13	8	8
Upland	16	14	4	4	5
Problem Exotics	3	3	2	0	2

Table 4. Importance values of major species by site at Prairie Ridge State Natural Area, Jasper County, Illinois

SPECIES	**Galbreath**	**Lew's**	**McGraw**	**Frohning**
Sorghastrum nutans	22.68	20.50	38.71	94.89
Andropogon gerardii	31.27	11.04	48.66	80.45
Solidago canadensis	0.82	43.20	12.74	7.83
Solidago nemoralis	33.42	14.30	16.67	--
Euthamia graminifolia	17.85	22.00	4.76	--
Rubus flagellarus	5.38	23.60	3.16	--
Vernonia missurica	7.42	15.15	0.80	--
Carex sp.	11.86	--	11.14	--
Eleocharis sp.	10.18	1.59	9.58	--
Schizachryrium scoparium	2.38	--	16.49	--
Pycnathemum tenuifolium	0.42	17.29	--	--
Cassia fasciculata	--	10.66	3.19	--
Panicum virgatum	2.52	--	1.11	--
Setaria faberi	0.43	--	--	11.03
Cyperus strigosus	1.67	--	9.46	--
Achillea millefolium	4.26	5.30	--	--
Euphorbia corollata	7.07	0.53	--	--
Hypericum perforatum	5.90	--	0.80	--
Dichanthelium acuminatum	5.90	0.53	--	--
Potentilla simplex	4.26	1.59	--	--
Asclepias syriaca	--	--	--	5.79
Verbena hastata	--	--	4.76	--
Malus ioensis	4.23	--	--	--

Scirpus georgianus	--	--	3.99	--
Desmodium paniculatum	--	3.80	--	--
Acalypha virginica	2.95	--	0.80	--
Lonicera japonica	2.52	0.53	--	--
Oxalis dillenii	2.98	--	--	--
Rosa carolina	2.89	--	--	--
Lespedeza intermedia	0.43	2.15	--	--
Cyperus ovularis	2.55	--	--	--
Baptisia lactea	2.38	--	--	--
Prunella vulgaris	--	2.15	--	--
Erigeron yuccifolium	--	--	1.60	--
Liatris pycnostachya	--	1.09	--	--
Cirsium discolor	--	1.09	--	--
Ambrosia bidentata	--	1.06	--	--
Viola pratincola	0.85	--	--	--
Oenthera biennis	0.82	--	--	--
Barbarea vulgaris	--	--	0.80	--
Hypericum mutilum	--	--	0.80	--
Paspalum laeve	0.43	--	--	--
Rumex acetocella	0.43	--	--	--
Sassafras albidum	0.43	--	--	--
Crotonopsis elliptica	0.42	--	--	--

Table 5. Importance values (IV) for major species on Frohning Farm at Prairie Ridge State Natural Area, Jasper County, Illinois

SPECIES	**Freq.%**	**R. Freq.**	**Av. Cov.**	**Rel. Cov.**	**IV**
Sorghastrum nutans	92	41.82	29.52	53.08	94.89
Andropogon gerardii	88	40.00	22.50	40.45	80.45
Setaria faberi	20	9.09	1.08	1.94	11.03
Solidago canadensis	12	5.45	1.32	2.37	7.83
Asclepias syriaca	8	3.64	1.20	2.16	5.80
TOTALS		100.00		100.00	200.00

Table 6: Importance values for major species on Galbreath Sanctuary at Prairie Ridge State Natural Area, Jasper County, Illinois

SPECIES	Freq. %	R. Freq.	Av. Cov.	Rel. Cov.	IV
Solidago nemoralis	82	13.40	12.16	20.03	33.42
Andropogon gerardii	62	10.13	12.84	21.15	31.27
Sorghastrum nutans	48	7.84	9.01	14.84	22.68
Euthamia graminifolia	56	9.15	5.28	8.69	17.85
Carex sp.	52	8.50	2.04	3.36	11.86
Eleocharis sp.	46	7.52	1.62	2.67	10.18
Vernonia missurica	20	3.27	2.52	4.15	7.42
Euphorbia corollata	22	3.60	2.11	3.47	7.07
Dichanthelium acuminatum	24	3.92	1.20	1.98	5.90
Hypericum perforatum	24	3.92	1.20	1.98	5.90
Rubus flagellaris	16	2.61	1.68	2.76	5.38
Achillea millefolium	20	3.27	0.60	0.99	4.26
Potentilla simplex	20	3.27	0.60	0.99	4.26
Malus ioensis	18	2.94	0.78	1.28	4.23
Oxalis dillenii	14	2.29	0.42	0.69	2.98
Acalypha viriginica	12	1.96	0.60	0.99	2.95
Rosa carolina	8	1.31	0.96	1.58	2.89
Cyperus ovularis	12	1.96	0.36	0.59	2.55
Lonicera japonica	10	1.63	0.54	0.89	2.52
Panicum virgatum	10	1.63	0.54	0.89	2.52
Baptisia lactea	4	0.65	1.05	1.73	2.38
Schizachyrium scoparium	4	0.65	1.05	1.73	2.38
Cyprerus strigosus	6	0.98	0.42	0.69	1.67

Viola pratincola	4	0.65	0.12	0.20	0.85
Oenothera biennis	2	0.33	0.30	0.49	0.82
Solidago canadensis	2	0.33	0.30	0.49	0.82
Lespedeza intermedia	2	0.32	0.06	0.10	0.43
Paspalum laeve	2	0.33	0.06	0.10	0.43
Rumex acetocella	2	0.32	0.06	0.10	0.43
Sassafras albidum	2	0.33	0.06	0.10	0.43
Setaria faberi	2	0.33	0.06	0.10	0.43
Crotonopsis elliptica	2	0.33	0.06	0.10	0.42
Pycnanthemum tenuifolium	2	0.33	0.06	0.10	0.42
TOTALS		100.00		100.00	200.00

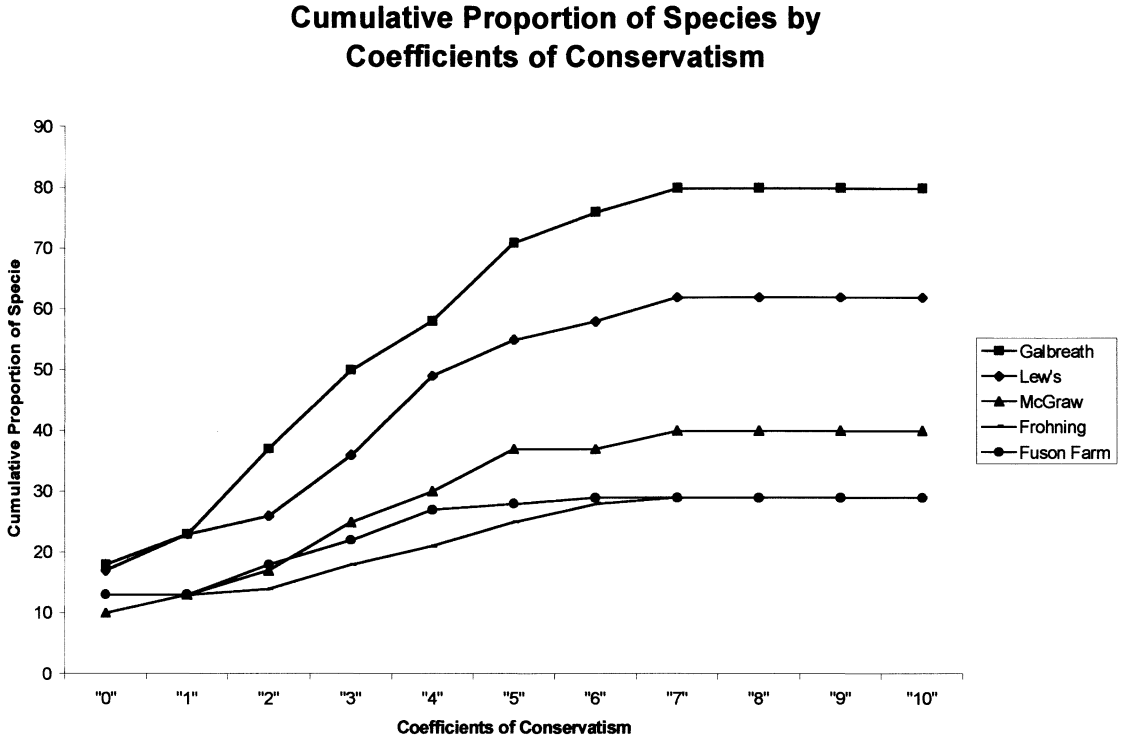
Table 7. Importance values for major species on Lew's Prairie at Prairie Ridge State Natural Are, Jasper County, Illinois

SPECIES	**Freq. %**	**R. Freq.**	**Av. Cov.**	**Rel. Cov.**	**IV**
Solidago canadensis	78	15.24	2.00	27.95	43.19
Rubus flagellaris	70	13.67	4.26	9.92	23.60
Euthamia graminifolia	64	12.50	4.08	9.50	22.00
Sorghastrum nutans	42	8.20	5.28	12.30	20.50
Pycnanthemem tenuifolium	42	8.21	3.90	9.08	17.29
Vernonia missurica	30	5.86	3.99	9.30	15.15
Solidago nemoralis	52	10.16	1.80	4.19	14.35
Andropogon gerardii	32	6.25	2.40	5.59	11.84
Cassia fasciculata	36	7.03	1.56	3.63	10.67
Achillea millefolium	20	3.91	0.60	1.40	5.30
Desmodium paniculatum	8	1.56	0.96	2.24	3.80
Lespedeza intermedia	6	1.17	0.42	0.98	2.15
Prunella vulgaris	6	1.17	0.42	0.98	2.15
Eleocharis sp.	6	1.17	0.18	0.42	1.59
Potentilla simplex	6	1.17	0.18	0.42	1.59
Liatris pycnostachya	2	0.39	0.30	0.70	1.09
Cirsium discolor	2	0.39	0.30	0.70	1.09
Ambrosia bidenta	4	0.78	0.12	0.28	1.06
Dichanthelium acuminatum	2	0.39	0.06	0.14	0.53
Euphorbia corrolata	2	0.39	0.06	0.14	0.53
Lonicera japonica	2	0.39	0.06	0.14	0.53
TOTALS		100.0		100.0	200.00

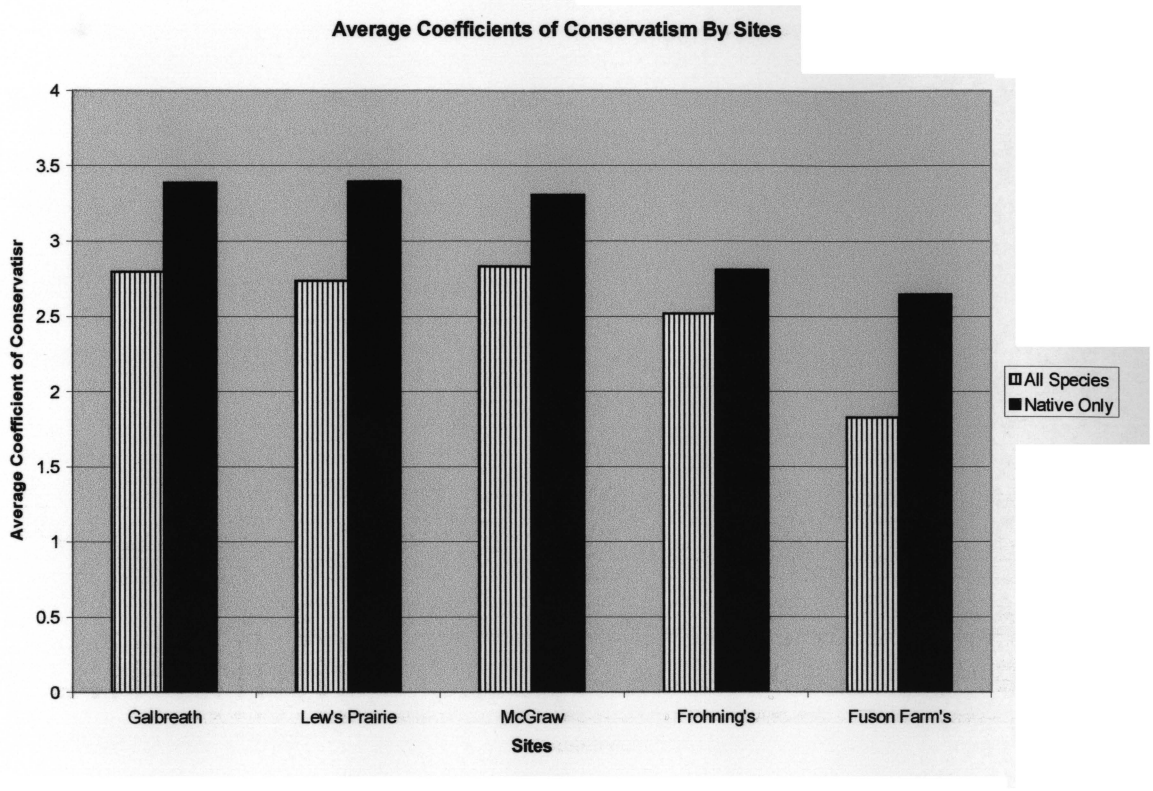
Table 8. Importance values for major species on McGraw Sanctuary at Prairie Ridge State Natural Area, Jasper County, Illinois

SPECIES	**Freq. %**	**R. Freq.**	**Av. Cov.**	**Rel. Cov.**	**IV**
Andropogon gerardii	48	14.54	10.66	34.11	48.65
Sorghastrum nutans	44	13.33	7.93	25.38	38.71
Solidago nemoralis	36	10.91	1.80	5.76	16.67
Schizachyrium scoparium	24	7.27	2.88	9.22	16.49
Solidago canadensis	30	9.09	1.14	3.65	12.74
Carex sp.	26	7.88	1.02	3.27	11.14
Panicum virgatum	24	7.27	1.20	3.84	11.11
Eleocharis sp.	24	7.27	0.72	2.30	9.58
Cyperus strigosus	16	4.85	1.44	4.61	9.46
Euthamia graminifolia	10	3.03	0.54	1.73	4.76
Verbena hastata	10	3.03	0.54	1.73	4.76
Scirpus georgianus	10	3.03	0.30	0.96	3.99
Cassia fasciculata	8	2.42	0.24	0.77	3.19
Rubus flagellarus	6	1.82	0.42	1.34	3.16
Eryngium yuccifolium	4	1.21	0.12	0.38	1.59
Acalypha virginica	2	0.61	0.06	0.19	0.80
Barbarea vulgaris	2	0.61	0.06	0.19	0.80
Hypericum mutilum	2	0.61	0.06	0.19	0.80
Hypericum perforatum	2	0.61	0.06	0.19	0.80
Vernonia missurica	2	0.61	0.06	0.19	0.80
TOTALS		100.00		100.00	200.00

Graph 1. Cumulative proportion of species at Prairie Ridge State Natural Area, Jasper County, Illinois by coefficients of conservatism



Graph 2. Average coefficients of conservatism by various prairie sites at Prairie Ridge State Natural Area, Jasper County, Illinois



Appendix 1: List of vascular flora by site at Prairie Ridge State Natural Area, Jasper County, Illinois

A list of the vascular flora observed at each of the five study sites at Prairie Ridge State Natural Area, Jasper County, Illinois in 1998. Sites are arranged alphabetically, and families, genera, and species are then arranged alphabetically. Taxa that are introduced are preceded by an asterix.

FROHNING'S FARM

MONOCOTYLEDONEAE

CYPERACEAE

Cyperus esculentus L.

POACEAE

Alopecurus carolinianus Walt.

Andropogon gerardii Vitman.

**Setaris faberi* Herrm.

Schizachyrium scoparium (Michx.) Nash.

Sorghastrum nutans (L.) Nash.

DICOTYLEDONEAE

APIACEAE

Eryngium yuccifolium Michx.

ASCLEPIADACEAE

Asclepias hirtella (Pennell) Woodson.

Asclepias incarnata L.

Asclepias syriaca L.

ASTERACEAE

Erigeron strigosus Muhl.

Eupatorium perfoliatum L.

Liatris pycnostachya Michx.

Rudbeckia hirta L.

Senecio glabellus Poir.

Solidago canadensis L.

**Sonchus asper* (L.) Hill.

BORAGINACEAE

Myosotis verna Nutt.

CAESALPINACEAE

Cassia fasciculata Michx.

EUPHORBIACEAE

Euphorbia corollata L.

FABACEAE

**Trifolium pratense* L.

HYPERICACEAE

Hypericum mutilum L.

Hypericum perforatum L.

MIMOSACEAE

Desmanthus illinoensis (Michx.) MacM.

ONAGRACEAE

Ludwigia alternifolia L.

OXALIDACEAE

Oxalis dillenii Jacq.

POLYGONACEAE

Polygonum pensylvanicum L.

RUBIACEAE

Galium aparine L.

Galium obtusum Bigel.

SCROPHULARIACEAE

Mimulus ringens L.

VERBENACEAE

Verbena hastata L.

FUSON FARMS (NOTE: This area was mowed 8-98)

MONOCOTYLEDONEAE

CYPERACEAE

Carex blanda Dewey

Carex cephalophora Willd.

Carex vulpinoidea Michx.

Cyperus strigosus L.

Scirpus georgianus Harper

JUNCACEAE

Juncus interior Wieg.

POACEAE

Agrostis perennans (Walt.) BSP.

**Festuca arundinacea* Schreb.

DICOTYLEDONEAE

ASCLEPIADACEAE

Asclepias incarnata L.

ASTERACEAE

**Achillea millefolium* L.

Erigeron strigosus Muhl.

**Leucanthemum vulgare* Lam.

Rudbeckia hirta L.

Senecio glabellus Poir.

BRASSICACEAE

**Barbarea vulgaris* R.Br.

CARYOPHYLLACEAE

**Dianthus armeria* L.

HYPERICACEAE

Hypericum mutilum L.

Hypericum perforatum L.

LAMIACEAE

Pycnanthemum tenuifolium Schrad.

OXALIDACEAE

Oxalis dillenii Jacq.

ROSACEAE

Geum laciniatum Murr.

**Potentilla recta* L.

Rosa carolina L.

Rubus flagellaris Willd.

SCROPHULARIACEAE

Penstemon pallidus Small.

VERBENACEAE

Verbena hastata L.

GALBREATH SANCTUARY

MONOCOTYLEDONEAE

CYPERACEAE

Carex bushii Mack.

Carex vulpinoidea Michx.

Cyperus acuminatus Torr. & Hook

Cyperus ovularis (Michx.) Torr.

Cyperus strigosus L.

Eleocharis verrucosa (Svens.) Harms.

JUNCACEAE

Juncus biflorus Ell.

Juncus brachycarpus Engelm.

Juncus interior Wieg.

Juncus torreyi Coville.

Luzula multiflora (Reetz.) Legeune, var. *L. echinata* (Small) F.J. Herm.

POACEAE

Agrostis hyemalis (Walt.) BSP.

**Alopecurus pratensis* L.

Andropogon gerardii Vitman.

Dichanthelium acuminatum (Sw.) Gould & Clark

**Festuca arundinacea* Schreb.

Panicum capillare L.

Paspalum laeve Michx.

Phleum pratense L.

**Setaria faberi* Herrm.

Schizachyrium scoparium (Michx.) Nash.

Sorghastrum nutans (L.) Nash.

DICOTYLEDONEAE

APIACEAE

Eryngium yuccifolium Michx.

ASCLEPIADACEAE

Asclepias hirtella (Pennell) Woodson.

ASTERACEAE

**Achillea millefolium* L.

Ambrosia bidentata Michx.

Coreopsis palmata Nutt.

Erigeron strigosus Muhl.

Eupatorium perfoliatum L.

Euthamia graminifolia (L.) Salisb.

Gnaphalium obtusifolium L.

Helianthus mollis Lam.

Rudbeckia hirta L.

Silphium terebinthinaceum Jacq.

Solidago canadensis L.

Solidago nemoralis Ait.

Vernonia missurica Raf.

BORAGINACEAE

Myosotis verna Nutt.

CAESALPINACEAE

Cassia fasciculata Michx.

CAMPANULACAEAE

Triodanis perfoliata (L.) Nieuwl.

CAPRIFOLIACEAE

**Lonicera japonica* Thumb.

CARYOPHYLLACEAE

Claytonia virginica L.

**Dianthus armeria* L.

COMMELINACEAE

Tradescantia virginiana L.

EUPHORBIACEAE

Acalypha virginica L.

Crotonopsis elliptica Willd.

Euphorbia corollata L.

FABACEAE

Baptisia lactea (Raf.) Thieret.

Lespedeza capitata Michx.

**Melilotus alba* Medic.

Strophostyles leiosperma (Torr. & Gray) Piper.

HYPERICACEAE

Hypericum mutilum L.

Hypericum perforatum L.

Hypericum punctatum Lam.

LAMIACEAE

**Prunella vulgaris* L.

Pycnanthemum tenuifolium Schrad.

Teucrium canadense L.

LAURACEAE

Sassafras albidum (Nutt.) Nees.

ONAGRACEAE

Gaura biennis L.

Ludwigia alternifolia L.

Oenothera biennis L.

OXALIDACEAE

Oxalis dillenii Jacq.

Oxalis violacea L.

PLANTAGINACEAE

**Plantago lanceolata* L.

Plantago virginica L.

POLYGALACEAE

Polygala sanguinea L.

Polygala verticillata L.

POLYGONACEAE

Polygonum pensylvanicum L.

**Rumex acetosella* L.

**Rumex crispus* L.

ROSACEAE

Malus ioensis (Wood) Britt.

Potentilla simplex Michx.

Rosa carolina L.

Rubus flagellaris Willd.

RUBIACEAE

Galium aparine L.

Galium obtusum Bigel.

SOLANACEAE

Solanum carolinense L.

VERBENACEAE

Verbena hastata L.

VIOLACEAE

Viola pratincola Greene

LEW'S PRAIRIE

MONOCOTYLEDONEAE

CYPERACEAE

Carex bushii Mack.

Carex vulpinoidea Michx.

Cyperus esculentus L.

Eleocharis verrucosa (Svens.) Harms.

JUNCACEAE

Juncus acuminatus Michx.

Juncus biflorus Ell.

Juncus interior Wieg.

LILACEAE

Camassia scilloides (Raf.) Cory

POACEAE

Agrostis perennans (Walt.) Tuckerm.

Andropogon gerardii Vitman.

**Bromus commutatus* Schrad.

Dichanthelium acuminatum (Sw.) Gould & Clark

**Festuca arundinacea* Schreb.

Panicum capillare L.

Phleum pratense L.

**Setaria faberi* Herrm.

Schizachyrium scoparium (Michx.) Nash.

Sorghastrum nutans (L.) Nash.

DICOTYLEDONEAE

ACANTHACEAE

Ruellia humilis Nutt.

ANACARDIACEAE

Rhus glabra L.

APIACEAE

Cicuta maculata L.

Eryngium yuccifolium Michx.

ASCLEPIADACEAE

Asclepias hirtella (Pennell) Woodson.

Asclepias syriaca L.

Asclepias verticillata L.

ASTERACEAE

**Achillea millefolium* L.

Ambrosia bidentata Michx.

Bidens aristosa (Michx.) Britt.

Cirsium discolor (Muhl.) Spreng.

Eupatorium perfoliatum L.

Euthamia graminifolia (L.) Salisb.

Liatris pycnostachya Michx.

Silphium terebinthinaceum Jacq.

Solidago canadensis L.

Solidago juncea Ait.

Solidago nemoralis Ait.

**Sonchus asper* (L.) Hill.

Vernonia missurica Raf.

BORAGINACEAE

Myosotis verna Nutt.

BRASSICACEAE

**Barbarea vulgaris* R.Br.

CAESALPINACEAE

Cassia fasciculata Michx.

CAPRIFOLIACEAE

**Lonicera japonica* Thumb.

CARYOPHYLLACEAE

Claytonia virginica L.

**Dianthus armeria* L.

EUPHORBIACEAE

Euphorbia corollata L.

FABACEAE

Desmodium paniculatum (L.) DC.

Lespedeza capitata Michx.

**Melilotus alba* Medic.

**Trifolium hybridum* L.

HYPERICACEAE

Hypericum mutilum L.

Hypericum perforatum L.

Hypericum punctatum Lam.

LAMIACEAE

Monarda fistulosa L.

**Prunella vulgaris* L.

Pycnanthemum tenuifolium Schrad.

OXALIDACEAE

Oxalis violacea L.

POLYGONACEAE

**Rumex crispus* L.

ROSACEAE

Potentilla simplex Michx.

Rosa carolina L.

Rubus flagellaris Willd.

RUBIACEAE

Galium aparine L.

Galium obtusum Bigel.

SCROPHULARIACEAE

Lindernia dubia (L.) Pennell.

Penstemon digitalis Nutt.

VERBENACEAE

Verbena hastata L.

MCGRAW'S FARM

MONOCOTYLEDONEAE

CYPERACEAE

Carex bushii Mack.

Carex hirsutella Mack.

Carex scoparia Willd.

Carex vulpinoidea Michx.

Eleocharis verrucosa (Svens.) Harms

Cyperus esculentus L.

Scirpus georgianus Harper

JUNCACEAE

Juncus biflorus Ell.

Juncus interior Wieg.

POACEAE

Andropogon gerardii Vitman.

**Echinochloa crus-galli* (L.) Beauv.

**Festuca arundinacea* Schreb.

Panicum capillare L.

Panicum virgatum L.

**Setaria faberi* Herrm.

Schizachyrium scoparium (Michx.) Nash.

Sorghastrum nutans (L.) Nash.

DICOTYLEDONEAE

APIACEAE

Eryngium yuccifolium Michx.

ASTERACEAE

**Achillea millefolium* L.

Erigeron strigosus Muhl.

Euthamia graminifolia (L.) Salisb.

Helianthus mollis Lam.

Solidago canadensis L.

Solidago juncea Ait.

Solidago nemoralis Ait.

Vernonia missurica Raf.

BORAGINACEAE

Myosotis verna Nutt.

BRASSICACEAE

**Barbarea vulgaris* R.Br.

CAESALPINACEAE

Cassia fasciculata Michx.

CAPRIFOLIACEAE

**Lonicera japonica* Thumb.

CARYOPHYLLACEAE

Claytonia virginica L.

**Dianthus armeria* L.

EUPHORBIACEAE

Acalypha virginica L.

Euphorbia corollata L.

HYPERICACEAE

Hypericum mutilum L.

Hypericum perforatum L.

LAMIACEAE

Pycnanthemum tenuifolium Schrad.

ONAGRACEAE

Gaura biennis L.

ROSACEAE

Potentilla simplex Michx.

Rubus flagellaris Willd.

RUBIACEAE

Galium aparine L.

Galium obtusum Bigel.

VERBENACEAE

Verbena hastata L.

Appendix 2. Summary of vascular flora at PRSNA

A summary of the vascular flora observed on five different restored prairie sites at Prairie Ridge State Natural Area, Jasper County, Illinois in 1998. Families, genera, and species are arranged alphabetically. Taxa that are introduced are preceeded by an asterix. After the binomial and authority, the life history (A = annual, B = biennial, P = perennial, W = Woody) is given followed by abundance class (1 = rare, 2 = occassional, 3 = common, 4 = abundant, 5 = very abundant. In parenthesis, the first observed, peak, and final flowering dates are included for some species. In bracts are the collection numbers for voucher specimens.

MONOCOTYLEDONEAE

CYPERACEAE

Carex blanda Dewey P, 2 [242]

Carex bushii Mack. P, 2 [249]

Carex cephalophora Willd. P, 1 [245]

Carex hirsutella Mack. P, 1 [216]

Carex scoparia Willd. P, 1 [275]

Carex vulpinoidea Michx. P, 2; (5/11, 6/5, 6/15) [285]

Cyperus acuminatus Torr. & Hook A, 1 [430]

Cyperus esculentus L. P, 2 [312]

Cyperus ovularis (Michx.) Torr. P, 1 [338]

Cyperus strigosus L. P, 2 [355]

Eleocharis verrucosa (Svens.) Harms P, 1 [215]

Scirpus georgianus Harper P, 2 [238]

JUNCACEAE

Juncus acuminatus Michx. P, 2 [250]

Juncus biflorus Ell. P, 2 [359]

Juncus brachycarpus Engelm. P, 2 [374]

Juncus interior Wieg. P, 2; (5/20, 6/5, 7/8) [353]

Jucus torreyi Coville. P, 2 [323]

Luzula multiflora (Retz.) Legeune, var. *L. echinata* (Small) F.J. Herm. P, 1

LILACEAE

Camassia scilloides (Raf.) Cory P, 1 [218]

POACEAE

Agrostis hyemalis (Walt.) BSP. P, 3 [259]

Agrostis perennans (Walt.) Tuckerm. P, 2 [326]

Alopecurus carolinianus Walt. A, 1 [212]

**Alopecurus pratensis* L. P, 1 [201]

Andropogon gerardii Vitman. P, 5; (7/24, 8/22, 10/2)

**Bromus commutatus* Schrad. 2 [266]

Dichanthelium acuminatum (Sw.) Gould & Clark P [260]

**Echinochloa crus-galli* (L.) Beauv. A, 1 [409]

**Festuca arundinacea* Schreb. P, 3 [241]

Panicum capillare L. A, [396]

Panicum virgatum L. [397]

Paspalum laeve Michx. P, 1 [425]

Phleum pratense L. P, 2 [335]

**Poa pratensis* L. P, 2; (5/28, 6/15, 7/24) [239]

**Setaria faberi* Herrm. A, 2; (7/24, 8/13, 8/31) [426]

Schizachyrium scoparium (Michx.) Nash. P, 4; (7/16, 8/19, 8/31) [440]

Sorghastrum nutans (L.) Nash. P, 4; (8/19, 8/31, 9/15) [408]

DICOTYLEDONEAE

ACANTHACEAE

Ruellia humilis Nutt. P, 1 [348]

ANACARDIACEAE

Rhus glabra L. W, 1 [358]

APIACEAE

Cicuta maculata L. B, 1

Eryngium yuccifolium Michx. P, 2 [365]

ASCLEPIADACEAE

Asclepias hirtella (Pennell) Woodson. P, 1; (7/24, 8/3, 10/20) [363]

Asclepias incarnata L. P, 1 [393]

Asclepias syriaca L. P, 2; (7/2, 7/8, 7/24) [331]

Asclepias verticillata L. P, 1 [400]

ASTERACEAE

**Achillea millefolium* L. P, 3; (5/20, 6/5, 7/8) [222]

Ambrosia bidentata Michx. A, 2; (8/19, 8/31, 9/20) [418]

Bidens aristosa (Michx.) Britt. A, 2; (8/22, 9/7, 9/20) [423]

Cirsium discolor (Muhl.) Spreng. P, 1; (8/13, 8/22, 8/28)

Coreopsis palmata Nutt. P, 1 [301]

Erigeron strigosus Muhl. A, 2; (5/28, 6/15, 7/24) [290]

Eupatorium perfoliatum L. P, 2; (8/13, 8/28, 10/20) [412]

Euthamia graminifolia (L.) Salisb. P, 2; (8/13, 8/31, 9/20)

Gnaphalium obtusifolium L. A, 1 [431]

Helianthus mollis Lam. P, 2; (8/13, 8/19, 9/20) [404]

**Leucanthemum vulgare* Lam. P, 1 [309]

Liatris pycnostachya Michx. P, 2; (8/3, 8/19, 10/20) [381]

Rudbeckia hirta L. P, 2; (6/23, 7/16, 8/19) [289]

Senecio glabellus Poir. A, 2; (4/30, 5/11, 5/25) [209]

Silphium terebinthinaceum Jacq. P, 1

Solidago canadensis L. P, 3; (8/3, 8/31, 10/20)

Solidago juncea Ait. P, 1 [416]

Solidago nemoralis Ait. P, 3; (8/13, 8/31, 10/20) [419]

**Sonchus asper* (L.) Hill. A, 1 [345]

Vernonia missurica Raf. P, 3; (8/3, 8/22, 10/20) [401]

BORAGINACEAE

Myosotis verna Nutt. A, 1; (5/6, 5/20, 6/15) [205]

BRASSICACEAE

**Barbarea vulgaris* R.Br. B, 2; (5/11, 5/20, 6/5) [204]

Cardamine hirsuta L. 2 [206]

CAESALPINACEAE

Cassia fasciculata Michx. A, 4; (7/16, 8/13, 10/20) [387]

CAMPANULACAEAE

Triodanis perfoliata (L.) Nieuwl. A, 1 [298]

CAPRIFOLIACEAE

**Lonicera japonica* Thumb. W, 1 [254]

CARYOPHYLLACEAE

Claytonia virginica L. P, 1 [207]

**Dianthus armeria* L. B, 2; (5/20, 6/15, 7/24) [235]

COMMELINACEAE

Tradescantia virginiana L. P, 1; (5/20, 6/23, 7/24) [371]

EUPHORBIACEAE

Acalypha virginica L. A, 1 [369]

Crotonopsis elliptica Willd. A, 1

Euphorbia corollata L. P, 3; (7/24, 8/13, 10/20) [437]

FABACEAE

Baptisia lactea (Raf.) Thieret. P, 2; (7/8, 7/24, 8/31) [366]

Desmodium paniculatum (L.) DC. 1 [414]

Lespedeza capitata Michx. P, 1

**Melilotus alba* Medic. B, 1; (6/15, 6/23, 7/16) [300]

Strophostyles leiosperma (Torr. & Gray) Piper. A, 1 [436]

**Trifolium hybridum* L. P, 1 [376]

**Trifolium pratense* L. A, 1 [311]

HYPERICACEAE

Hypericum mutilum L. P, 2; (7/16, 7/24, 8/19) [292]

Hypericum perforatum L. P, 2; (6/23, 7/24, 8/19) [302]

Hypericum punctatum Lam. P, 2; (7/2, 8/3, 8/13) [382]

LAMIACEAE

Monarda fistulosa L. P, 1 [380]

**Prunella vulgaris* L. P, 2; (7/24, 8/3, 8/13) [389]

Pycnanthemum tenuifolium Schrad. P, 3; (6/15, 7/16, 8/13) [318]

Teucrium canadense L. P, 1 [367]

LAURACEAE

Sassafras albidum (Nutt.) Nees. W, 1 [202]

MIMOSACEAE

Desmanthus illinoensis (Michx.) MacM. P, 1 [347]

ONAGRACEAE

Gaura biennis L. B, 1; (8/22, 8/28, 9/20) [406]

Ludwigia alternifolia L. A, 2; (7/24, 8/13, 8/19) [368]

Oenothera biennis L. B, 2 [386]

OXALIDACEAE

Oxalis dillenii Jacq. P, 2 [210]

Oxalis violacea L. P, 1 [220]

PLANTAGINACEAE

**Plantago lanceolata* L. P, 1 [316]

Plantago virginica L. A, 1 [261]

POLYGALACEAE

Polygala sanguinea L. A, 2; (6/23, 7/16, 8/3) [325]

Polygala verticillata L. A, 1; (6/23, 7/8, 8/3) [314]

POLYGONACEAE

Polygonum pensylvanicum L. A, 1 [407]

**Rumex acetosella* L. A, 1

**Rumex crispus* L. P, 2; (5/29, 6/5, 6/23) [247]

ROSACEAE

Geum laciniatum Murr. P, 1 [303]

Malus ioensis (Wood) Britt. W, 1

Potentilla simplex Michx. P, 3; (5/11, 5/20, 6/23) [219]

**Potentilla recta* L. P, 1 [291]

Rosa carolina L. W, 2; (6/5, 6/15, 7/8) [357]

Rubus flagellaris Willd. W, 2; (5/4, 5/20, 6/15) [214]

RUBIACEAE

Galium aparine L. A, 1; (5/11, 5/25, 6/23) [211]

Galium obtusum Bigel. P, 1 [225]

SCROPHULARIACEAE

Lindernia dubia (L.) Pennell A, 1 [255]

Mimulus ringens L. P, 1 [391]

Penstemon digitalis Nutt. P, 2; (5/28, 6/5, 6/15) [229]

Penstemon pallidus Small P, 1 [236]

SOLANACEAE

Solanum carolinense L. P, 1; (7/8, 7/16, 8/13) [362]

VERBENACEAE

Verbena hastata L. P, 3; (7/2, 8/3, 10/20) [332]

VIOLACEAE

Viola pratincola Greene P, 1 [438]